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ABSTRACT

This handbook is designed to help three groups: the administrator who does not have the services of a media specialist, the media specialist who wishes to expand his knowledge or skills, and the classroom teacher who recognizes the value of the overhead as a teaching tool and is looking for practical assistance. Guidelines are provided in 11 chapters: (1) handmade transparencies; (2) heat transfer transparencies; (3) diazo transparencies; (4) photographic ("wet process") transparencies; (5) planning the visual; (6) color-lift transparencies; (7) mounting transparencies for projection; (8) commercially produced overhead materials; (9) special uses and effects; (10) implementation of the local overhead program; and (11) the projector. A list of suppliers is appended, as well as a list of other Film Library publications which are available from the same address. (MER)

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THE OVERHEAD SYSTEM: production implementation & utilization

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preface

The use of the overhead projector as a communication tool in the classroom has contributed much to increasing the effectiveness of the teacher. Today the overhead projector is recognized as basic classroom equipment.

This handbook was designed to give the classroom teacher a better understanding of the role of the overhead projection system in teaching and ways of using projectuals as an integral part of the teaching-learning process.

Grateful acknowledgement is expressed to Roy Frye, Spencer Guimarin and Robert Sloan for consultative assistance and to Marylyn Kiehne who arranged and typed the text.

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introduction

Having been used by the military services for a number of years, the overhead projector is certainly no newcomer to the field of instructional devices. However, its size and expense kept it out of reach of most educators during that time. With the advent of low-cost, lightweight projectors of the past few years, the overhead has suddenly become the darling of instructional devices--perhaps rightly so, as it has an extremely unique contribution to make in the realm of instructional media.

Educators, now as never before, suddenly find themselves enabled to obtain all kinds of equipment and materials to develop and support an instructional media program. In many cases the overhead system is becoming a basic part of that program. This handbook is designed to help (1) the administrator who does not have the services of a media specialist, at least to get this aspect of his program "off the ground;" (2) the media specialist or A-V Director who feels the need for expanding his knowledge and

skills concerning the implementation of the overhead system; (3) the classroom teacher who sees the value of the overhead as a teaching tool and is looking for practical help in using it as such.

There is a projector that is similar to the overhead, it is called an opaque projector. It is used to project from books, charts, maps, and other materials that do not lend themselves to the making of transparencies. It is used to project those visuals that are not transparent.

In this book we are concerned with the overhead system in its entirety. This includes the projector and all of the materials that can be used with it. Its operation requires the same approximate skill as the average desk lamp. Its utilization is another matter. Its uniqueness lies in the fact that it lends itself to the projection of locally produced materials with a facility that no other medium can boast.

VERSATILITY

As a device it can be used to project transparent solid objects such as a slide rule. It can project opaque objects such as two-dimensional geometric shapes or parts of a mathematical set. It will accept teacher-made transparencies or commercially produced transparencies for projection. It can be used to reveal portions of a transparency. Multiple overlays can be used on one transparency to develop sequential steps in a dynamic manner. Acceptable visuals can be prepared for projection on the overhead without any cameras or machines of any kind. Or, it can simply be used as a chalkboard to write on during instruction.

LITTLE OR NO LIGHT CONTROL REQUIRED

There is no need to plunge the room into darkness. In most cases it is not even necessary to turn off the lights. Small wonder. The 7" x 9" area of the frame being projected is 450 times that of the frame of a 16mm motion picture film. It requires relatively little enlargement and consequently gives much more light on the screen.

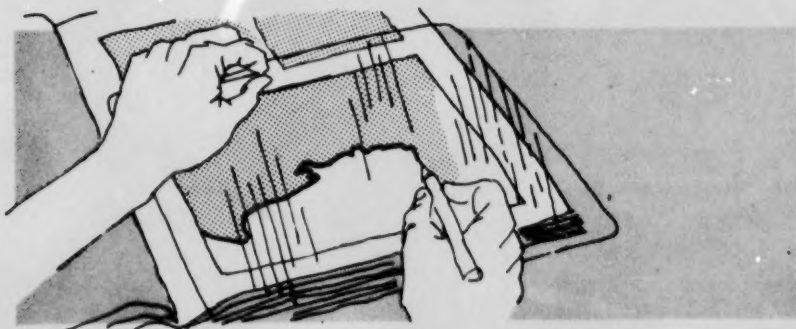
DOES NOT REPLACE THE TEACHER

The teacher cannot slip out for coffee or stand at the back of the room while the overhead performs. Instead, it is an extension of the teacher's communication skills and causes direct involvement in instruction. The teacher using an overhead is not only literally still at the front of the class but is facing the class at all times. No, the teacher is not replaced, but is more involved than ever.

i.

handmade transparencies

A relatively simple and inexpensive kind of transparency--as far as materials are concerned--is the handmade visual produced directly on the film to be projected. A sheet of clear acetate or reprocessed X-ray film serves as the base for the visual. A China Marker (grease pencil) can be used to write or draw on the film. Finer lines can be had with grease pencils which are especially produced for the overhead and come in various colors.



Felt-tipped markers and pens can be used to add brilliant color to the visual. Those using an oil-base ink generally work better on film than those with water-base ink, which sometimes tends to "ball-up" before it dries. There are now products on the market made especially for transparency work. With these a fine line can be made which projects vividly. Pens with a built in ink supply, are convenient to use and last amazingly long. A drop of water usually adds life to a dried-out pen.



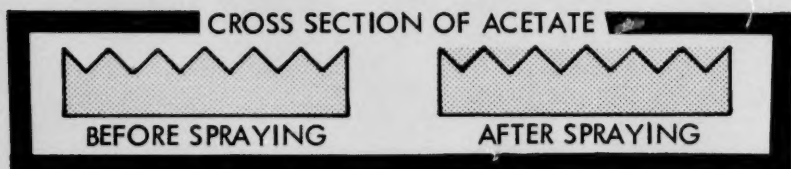
To keep black ink from mixing with other colors you simply do the black work on one side of the film, turn it over and add color on the reverse side. Oil-base and water-base inks can be used together on the same side as they are less inclined to mix or run together.

Technical drawing pens using india ink work exceptionally well. However, acetate must first be "sized" (dusted with magnesium carbonate to enable the ink to adhere to the film.) Reprocessed X-ray film, however, is already "sized" and need not be treated before use. For a more permanent handmade transparency india ink is best. At least one firm now produces a technical pen which

accepts india ink cartridges, thus eliminating the need for dipping and filling.

Transparency production kits are marketed containing many of these materials but sometimes include other items that the classroom teacher will never need nor use. Such a kit, however, might be a very convenient way to get started if you have no materials at all.

Etched or "frosted" acetate, having a matte finish, can be used for special-purpose visuals. The surface has "tooth" which accepts lead pencil, making continuous tone sketches and drawings possible. When the drawing is finished, you must eliminate the "tooth" by spraying the surface of the film with an acrylic spray which will coat it with clear plastic. As soon as it is dry,

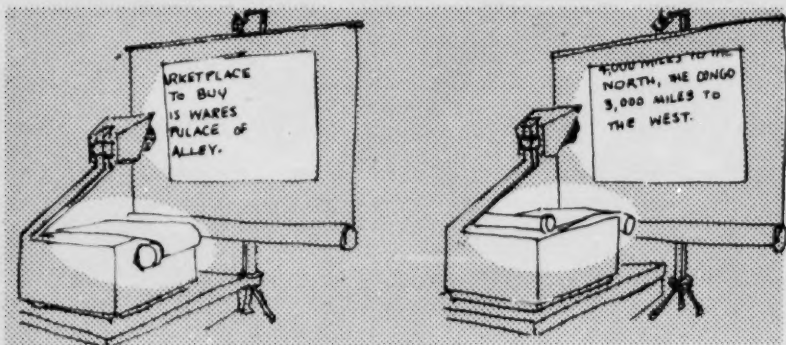


the visual is ready for projection. This would be an excellent way for an art instructor to demonstrate various shading techniques. Frosted acetate can also be used to make a transparency from an ordinary spirit master. Run master until paper copies are sharp and clear. Stop machine. Set pressure to highest adjustment. Run through a sheet of etched acetate with etched side up. "Clear" acetate by spraying as above.



Another base for the handmade transparency is the acetate roll. For almost all projectors a roll attachment is available which enables you to crank the visuals across the stage of the projector. Some advantages are:

1. You can prepare a series of drawings or notes on the roll before class and then reveal it bit by bit to be seen or copied by students.
2. Lecture notes are automatically kept in sequence on the roll. One can simply crank back to refer to previous content.



Certain disadvantages (as compared to separate transparencies) are apparent:

1. Flexibility is limited. You may have to crank for 20 feet to refer back to a particular portion.
2. Grease pencil writing will smear from being rolled up.
3. Some roll attachments operate from left to right across the projection stage, making it impossible to reveal material a line at a time. The attachment which works from top to bottom is certainly preferable.

4. If the cranking mechanism jams or fails to operate properly, you are in trouble. Your visual may be temporarily inaccessible.

All this should be borne in mind when considering the acetate roll as a means of presentation.

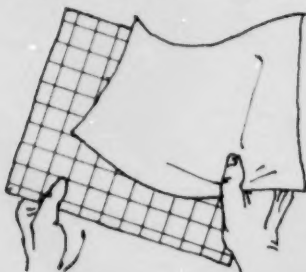
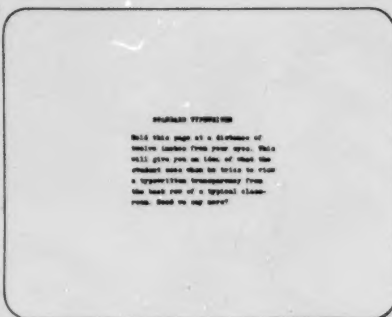
Lettering for transparencies

The basic principles mentioned here apply equally well whether you are lettering directly on the film or on a paper "master" to be used to produce a diazo or heat-transfer transparency as discussed in Chapters II and III.

Lettering size is all important.

The most common error, found in both commercially produced and locally made transparencies is that of using lettering of inadequate size. (Special carbon paper is available which enables you to type on acetate, but the results are usually not very impressive.) Letters $1/4$ " in height should be the minimum size used

on your finished transparency. Teachers of the primary grades would do better to use $3/8$ " or $1/2$ " as a minimum size.



Lettering helps. A grid sheet placed beneath the master on which you are working may be helpful in keeping things lined up properly.

Spacing letters. Use common sense, and better results will be obtained. Don't give every letter equal linear space. Instead, give a letter only the space it needs as shown in the top example.

**SPAC
SPAC**

$\frac{3}{16}$ **special**

$\frac{1}{32}$

$\frac{3}{16}$ **reference**

$\frac{1}{32}$

$\frac{3}{16}$ **program**

Spacing lines. The tendency is usually to put lines too close together. The results are difficult to read when projected. A good rule of thumb is to allow 1 1/2 times the letter height between lines as a minimum space.

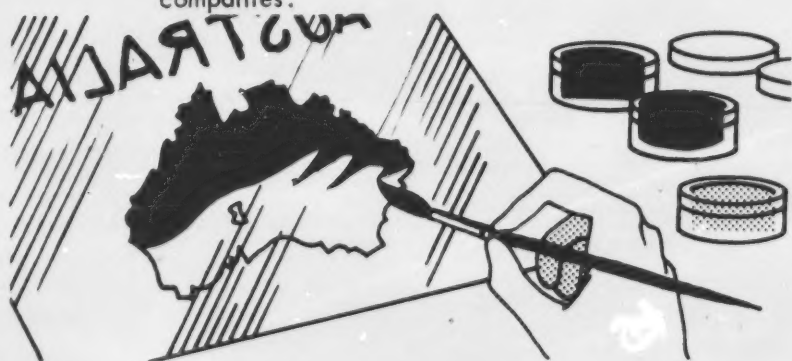
Best results can be obtained (whether lettering either directly on film or on a paper "master") by using a technical pen with a lettering guide. The Wrico-Printer Leroy system offers the layman a means of producing professional lettering in a variety of sizes and several styles. Anyone can learn to use this equipment in a short time. Why subject students to atrocious examples of crude hand-lettering when a professional job can be done in less time?

Materials for transparencies

Special materials of various kinds are available for handmade transparencies:

1. Tinted-acetate - To be used in the same way as the clear sheets, the difference being that during projection, the entire background has a color tint. Basic colors are available.

2. Pressure-sensitive color sheets - Useful in making graphs. Simply cut a piece to the size required and place it on your clear film base. It is easy to apply and can be adjusted on transparency; it is easily removed, thus not too satisfactory for a permanent transparency.
3. Dry-transfer letters and symbols - You place the letter sheet on your film and rub or burnish the desired letter with a stylus or ball-point pen. Remove the sheet and the letter is adhered to the film; it cannot be adjusted or moved after application.
4. Transparent tapes - Tapes of various colors and patterns may be used to add emphasis and contrast to a visual. As indicated earlier, anything adhered to the surface of the film should be considered temporary in nature.
5. Colored inks - Applied with a brush and thus not quite as handy as felt-tipped markers, these inks are designed specifically for overhead projection. They can be used very effectively by an artist to produce a "watercolor" effect on a transparency. These inks are also available in "felt-tipped" pens from various companies.



Erasing

All water-base inks are easily erased by a sponge or cloth moistened with water. Oil-base inks (such as in many felt-tipped markers) and grease pencil marks can be fully erased by moistening your cloth with lighter fluid. Theoretically, you can use the same film over and over again.

Advantages

1. The handmade transparency is inexpensive in terms of materials. X-ray film, for example, is both inexpensive and reuseable as stated above, and marking utensils are conveniently priced and easily procured.
2. No machine is required. A teacher can make transparencies at home or in school. The teacher can even make a transparency on the projector as the whole class watches.
3. Students can make their own transparencies even in first grade.

Children's illustrations, done with a pen or grease pencil, can be immediately projected for all to see. Children can write a paragraph or short story directly on the film for immediate projection. (Most ball-point pens will write on X-ray film and even project in color.)



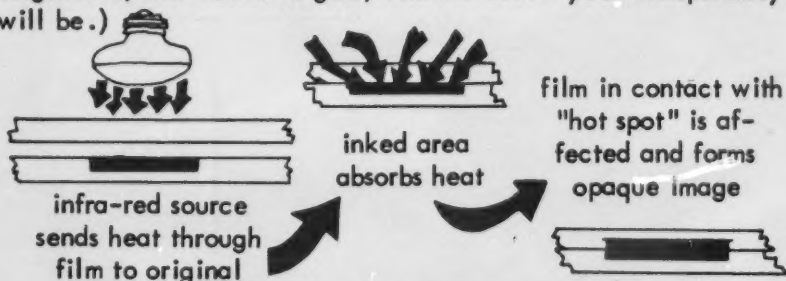
Disadvantages

1. Handmade transparencies, unless done with ink, do not keep well. Grease pencil marks smear.
2. They often lack the professional look which can be obtained with other processes.
3. In terms of time this can be the most expensive kind of transparency. Carefully tracing a weather map from the newspaper can be a slow tedious process. A much quicker method, which would give you a perfect transparency of the map in a few seconds, would be to use the heat-transfer process described in the next chapter.

ii.

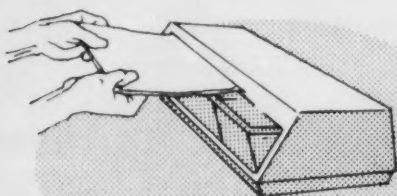
heat transfer transparencies

Variously described as the "thermal-copy," "dry-heat," or "heat-transfer" process, this one-step system makes it possible to produce a finished transparency from almost any original in a matter of seconds. What happens is this: heat from an infrared light passes through the transparency film to the original. The darkened areas of the original absorb more heat, and this increase in temperature forms an image on those areas of the film in contact with it. (It logically follows, then, that the blacker your original is, the hotter it gets, and the better your transparency will be.)

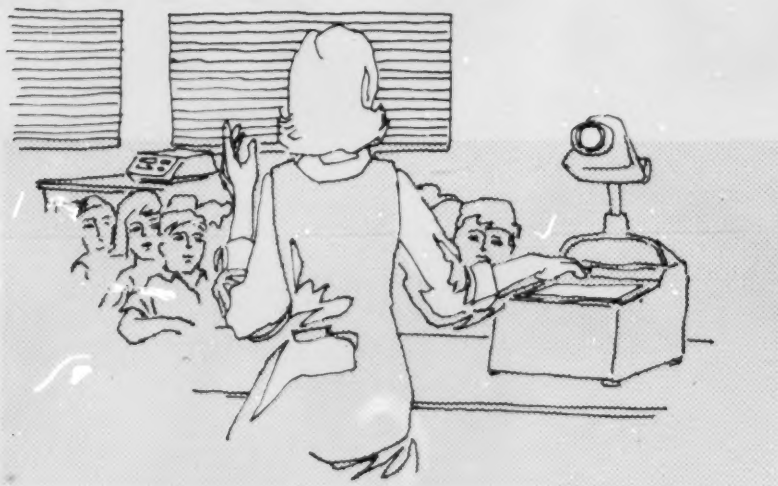


The original can be either on fully opaque or translucent material. However, the original should be no thicker than a sheet of paper that will easily pass through the machine. The artwork, lettering, etc., should be as opaque as possible. India ink, printer's ink, and lead pencil, for example, will reproduce well.

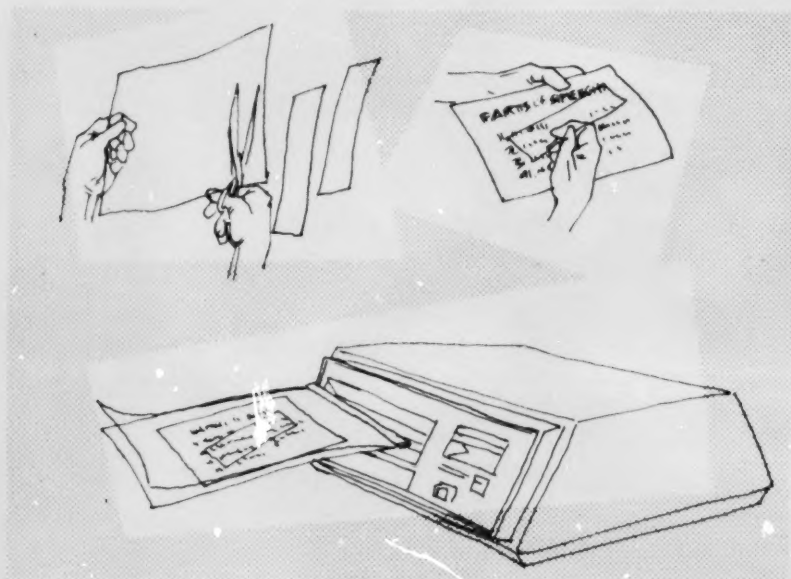
The obvious virtue of the heat-transfer process is that within a few seconds you can make a ready-to-go transparency from almost anything on a sheet of paper,—a map from today's newspaper, a pencil-written paragraph, or an india ink drawing. You can also piece together a "master" from various materials. For example: You have a map of Viet Nam from a magazine which is suitable for a transparency; however, the caption is too small. Trim off the caption. From a newspaper you clip the words "Viet Nam" in the size type desired (1/4" or more). Arrange both on a sheet of bond paper. Place heat-transfer film over this and feed through machine.



To fully exploit its "immediacy-potential" the heat-transfer machine should be located in the classroom. Thus, student work can be immediately projected, discussed, and corrected for the entire class to see. This is impossible if the machine is 100 yards away.



As various factors can affect the machine's heat settings (such as area voltage changes or whether or not the machine has just been used), it may be a money-saver to run test strips before making a transparency. Then the setting can be adjusted if necessary without having wasted a full sheet of film. (Running the test strip in a silk-screen carrier will eliminate the possibility of too small a strip becoming caught in the machine.)



Most heat-transfer machines operate in the same general way.

1. Place master, face-up, on flat surface.
2. Place fax-film on the master. (Film is usually notch-coded to indicate the coated side which goes against the master.)
3. Adjust heat control setting to proper position.

4. Run test strip (less necessary after experience).
5. Feed master and film into machine.

Types of film

Various types of film are available. One produces an etched image positive which then can be colored with special pencils. Another gives a black-line or direct reading image. This can also be had with a tinted color background. Color negative film is also available. If the learning situation calls for each student to have a copy of what you wish to project on the screen, special thermal spirit masters can be used. The master can then be projected.

For a low-cost "flimsy" polyester transparency, polyester film, such as is used in protecting your dry cleaning or in making plastic sandwich bags, can be used. However, the flimsiness of the material limits this type to the one-time-use category.

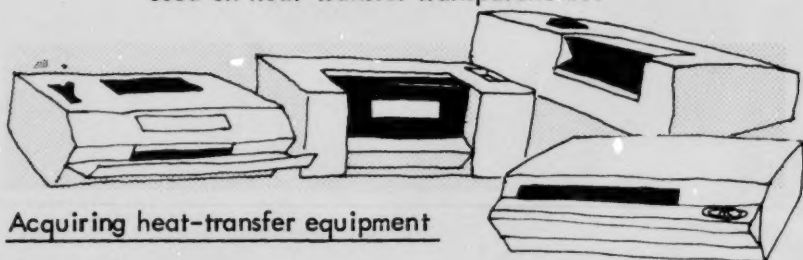
Here's how it is done:

1. Cut polyester film to approximate size of an 8 1/2 x 11 inch sheet. (Some plastic food-wrap bags come in rolls 11 inches wide which is quite convenient.)
2. Just as with heat-transfer film, place your sheet of film on top of the master with the latter lying face up.
3. Place the two in a silk-screen carrier. Be sure film does not hang out of carrier at any point.

WARNING - A silk-screen carrier must be used to transport flimsy polyester film. Without it the film will usually become tangled inside the machine. Though probably the least expensive transparency possible, this is at best a stop-gap system for one-time-use transparencies. If you need to mark on your "flimsy," simply place a sheet of X-ray film over it and mark on it.

Hand-coloring heat-transfer transparencies

1. Special coloring pencils are designed for use with etched image positive film. This film looks white, projects black. You mark on the reverse side of film on the etched portion.
2. Oil-base felt-tipped pens usually work well on all types of heat-transfer film including the polyester "flimsy." Water-base markers give results that are less satisfactory in this case.
3. Self-adhesive color sheets mentioned earlier can be used on heat-transfer transparencies.



Acquiring heat-transfer equipment

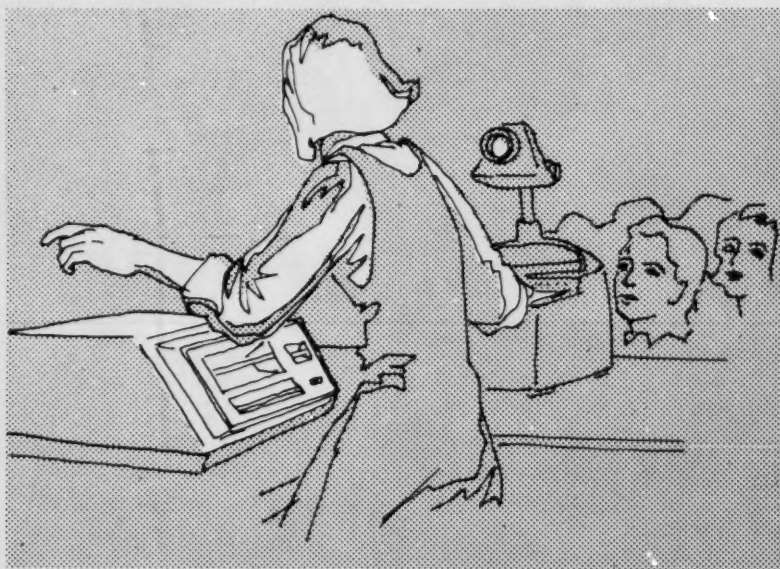
What are some criteria for selecting equipment?

1. Which system offers best local service to your school? A well-designed heat-transfer unit is a fairly complex machine and occasionally requires expert maintenance. This is a prime consideration.

2. The lowest price may be far from the highest quality. Some units are self-adjusting as they heat up. Others may require manual adjustment from one transparency to the next.
3. The few types of heat-sensitive films on the market are compatible with different makes of machines.

Placing the heat-transfer unit

The heat-transfer machine, long used primarily as an office copy machine, often winds up in the school office. If the office needs one, it should have its own. To be fully exploited in terms of learning, this unit needs to be very accessible to the teacher. Where schools are committed to providing the best education possible, this unit is kept with the overhead projector--IN THE CLASSROOM.



Summary

The heat-transfer method:

1. Copies almost any black-line original on either opaque or translucent material.
2. Produces in a few seconds a transparency ready to project. Thus this system has "immediacy-potential."
3. Is a means of producing low-cost "flimsy" transparencies.

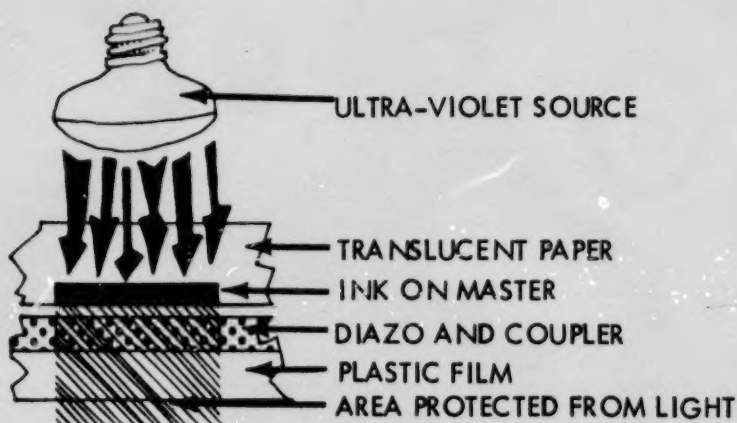
iii.

diazo transparencies

This excellent means of producing transparencies in brilliant color is called the "diazo process." Though the process is more sophisticated than the heat-transfer method, the equipment and materials required are basically quite simple:

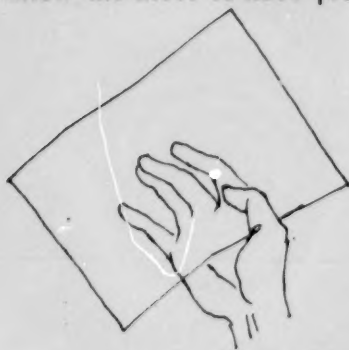
1. Master on translucent paper or transparent film.
2. Diazo film.
3. Ultraviolet light source for exposing film.
4. Development chamber containing 26-28% Baume ammonia fumes.

Diazo film consists of a base of transparent plastic with a special chemical coating. Two key elements in this coating are (1) a diazonium salt (or simply "diazo"), and (2) a "coupler" which



reacts to ammonia fumes by uniting with the diazo to produce a color dye.

Held in your hand, a sheet of "red" diazo film simply appears to be a sheet of colorless plastic. Pop this sheet directly into a jar of ammonia fumes and the entire sheet turns bright red. If you allow the sheet to have prolonged exposure to ultraviolet light



and then place it in the jar, nothing will happen. The diazo has been burned out, and color cannot form. The trick, then, is to protect from the ultraviolet light only those places on the film where you want color to appear. This is the function of the opaque images and lettering on your master.

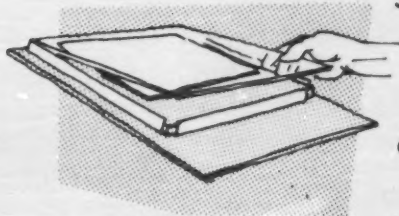
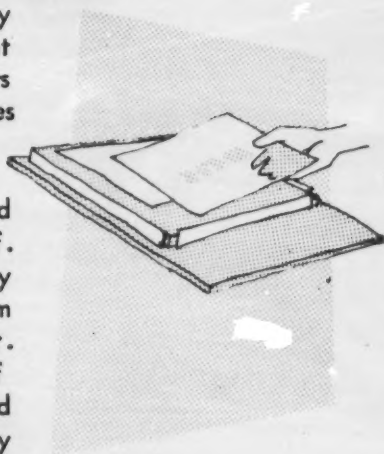
Making a diazo transparency



1. Using india ink (or something similarly opaque) prepare master on a sheet of translucent paper.
2. Remove sheet of diazo film and metallic interleaf from package.

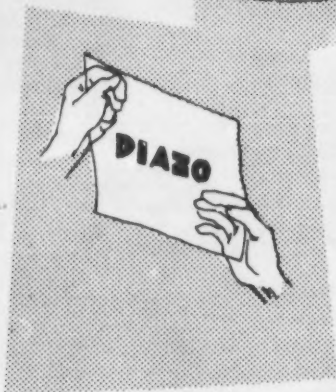
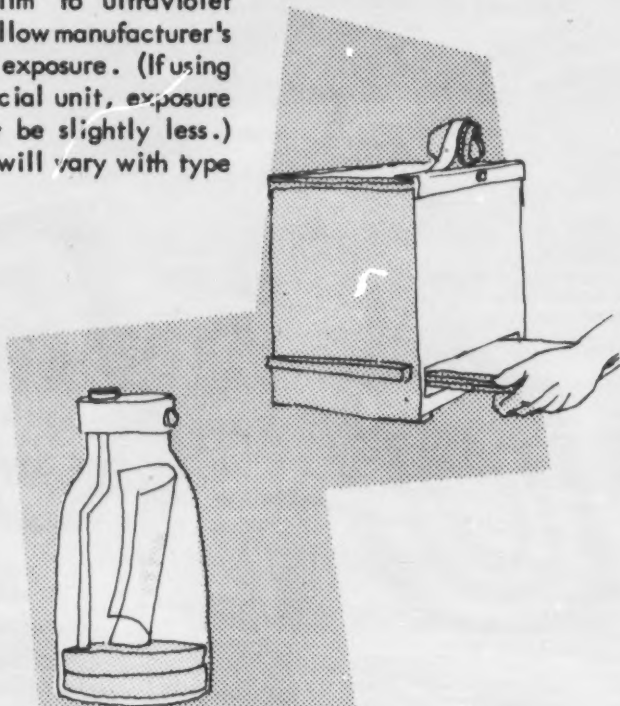
3. Place interleaf with shiny or reflective side up on flat surface. The foil reflects ultraviolet light and increases printing speed.

4. Place diazo film, with coated side up, on the interleaf. (Coated side of film is usually facing you when notch in film is in upper right-hand corner. When in doubt, touch tip of tongue to both sides. Coated side will produce a mildly bitter but harmless taste.)



5. Place master, face-down, on film (inked side of master against coated side of film).
6. Place cover glass over "sandwich" to hold master flat against film.

7. Expose film to ultraviolet light. Follow manufacturer's suggested exposure. (If using a commercial unit, exposure time may be slightly less.) Exposure will vary with type of film.



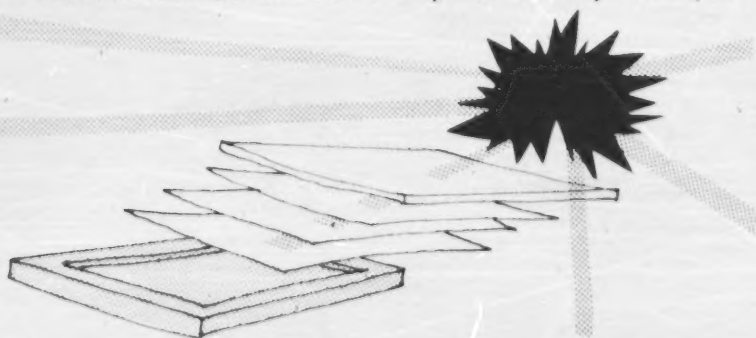
8. Remove film from "sandwich" and place it in container of ammonia fumes. Development will take place in a minute or less if ammonia is fresh and full strength. If not fully developed, simply place film back in container for additional time needed. (Weak or old ammonia will require much longer development time.)

Preparing the diazo master. Because of the basic principle involved, masters can be on either translucent or transparent material. Almost any kind of translucent paper will produce a diazo master. The finer the paper, the better the result. A 9-lb. onionskin will work. (It will probably require twice the normal exposure time.) A 16-lb. vellum with 100% rag content will work much better. Tracing paper sketch pads from a drafting supply house will usually be close to the latter.

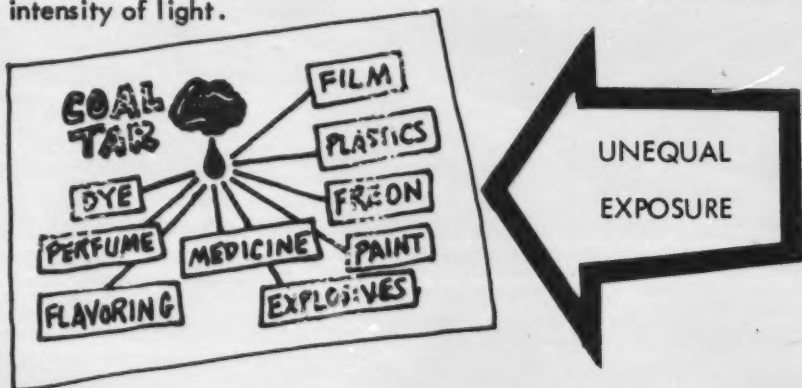
A good sharp black-line heat-transfer transparency can serve as a one-time master. This is sometimes useful when your original is on opaque paper and you desire to make a diazo transparency from it.

Whether your master is on translucent or transparent material, the important thing to remember is to be certain that the image is as opaque as possible. Consequently, india ink will reproduce better than lead pencil. Ball-point pens with opaque ink designed for just this purpose are on the market. However, technical fountain pens which write with india ink are hard to beat.

Exposing the film. If you live in a constantly sunny region you will never have problems. Good diazo film can be beautifully exposed in about 90 seconds of direct sunlight. However, experiments have shown that on heavily overcast days an exposure



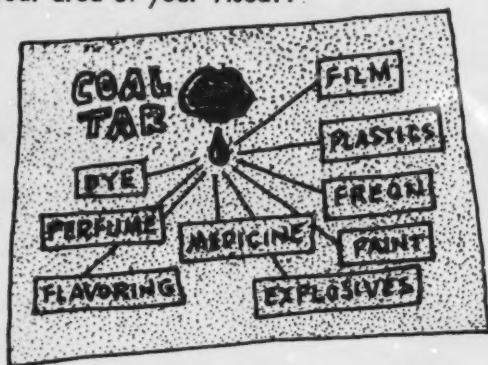
time of as much as 10 minutes is required to get the same results-- hardly a very dependable means of exposure. One individual built a homemade exposure unit using four 20-watt incandescent light bulbs. His exposure time was about 30 minutes, and the unit required an electric fan to keep from overheating the film. Other homemade (and some commercial) units employ fluorescent lamps as the ultraviolet source. One big problem in makeshift exposure units is that of giving the entire sheet of film an equal intensity of light.



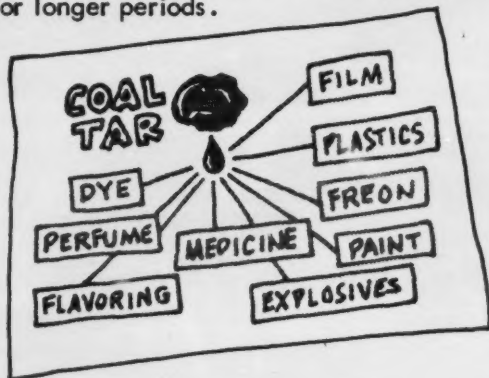
The stage of some overhead projectors can be used as an exposure unit. The lamp in the projector will determine the exposure time. Good results were obtained using a CTS 1000-watt lamp with a 6-minute exposure. A DFW 500-watt lamp required 11 minutes or nearly twice as long. Quartz iodine and bromine lamps tend to have a "hot spot," overexposing the center of the film, and consequently cannot be used for exposure.

Well-engineered commercial exposure units are probably less expensive than any makeshift devices in the long run. Wasted film and lost man-hours generally offset any initial dollar savings. A good unit includes a built-in timer which is a valuable part of your exposure unit. Exposure time (depending on the film) in commercial units generally requires from 1 1/2 to 3 minutes.

Underexposed film will generally develop a muddy or dirty background. The "mud" is made up of little flecks of color, indicating that you failed to sufficiently "burn out" the unneeded diazo in the clear area of your visual.



Overexposed film will have a "washed-out" appearance and will resist efforts to darken even though left in the development chamber for longer periods.



Developing diazo film. The basic requirements for a developing unit are these:

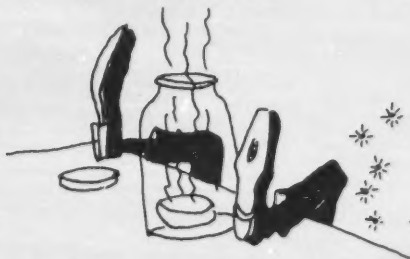
1. 28% Baume ammonia (also called "aqueous ammonia")

or "ammonium hydroxide") to provide fumes. Household ammonia is far too weak to be satisfactory.

2. A sponge to assist vaporization of the ammonia.
3. A development chamber which is simply a closed container large enough to hold a sheet of film and tight enough to retain the strong ammonia vapor.



Many an empty large pickle jar has served as such a container. The disadvantage of the homemade jar-chamber is that of screwing the lid off and on. It takes more time and leaks more fumes. The commercial units have a tightly sealed spring-operated lid which opens easily and automatically closes itself. This is an important feature. Unlike household ammonia, the Baume type is of such a strength that direct inhalation of its fumes can be a painful and extremely unpleasant experience. Never check the strength of the ammonia in the jar by sniffing at the opening. As



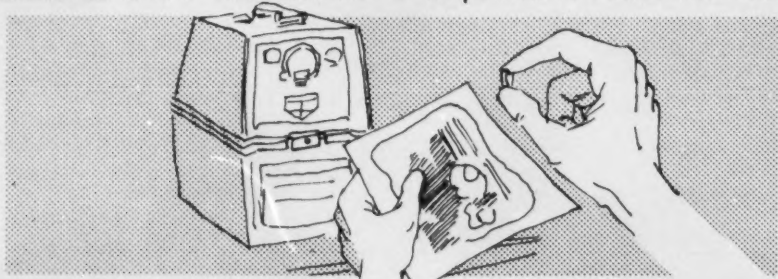
its strength wanes, the developing time will grow longer and longer. When you can see liquid building up in the bottom of the jar, this is your cue to replace the ammonia with a fresh amount. Your ammonia has evaporated and leaves the water behind. This dilutes the solution to such an extent that it is useless to add more ammonia.

To change ammonia:

1. Wash out the jar and the sponge.
2. Let both air-dry completely.
3. Place sponge in jar and add one cup of ammonia.
4. Repeat the procedure at least once every three months.

Various types of diazo units

At least one commercial unit has a heating element around the developing chamber which speeds up the vaporization process and the development process as well. Heat is also used in dry ammonia units. The ammonia is in powder or tablet form and

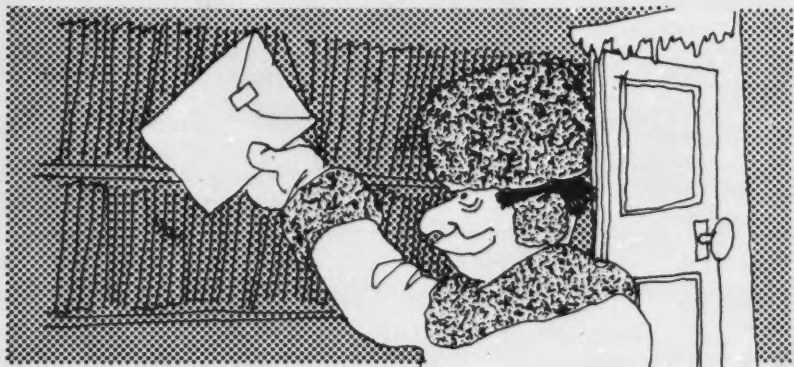
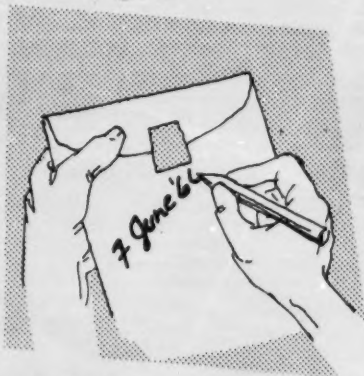


becomes vaporized by heat. The dry ammonia is more convenient to handle. The liquid ammonia is easier to control in the development process.

Film

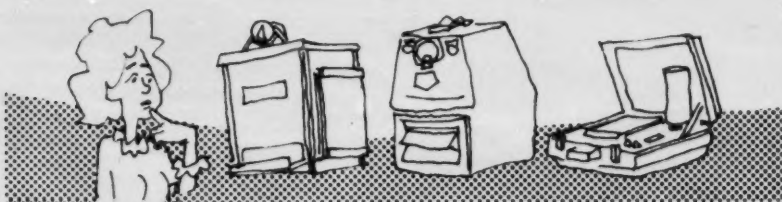
Major producers of diazo film are listed in the appendix. All films are compatible with the various diazo processing units on the market. Try several sources that will guarantee fresh film. Compare the films. They are not all alike. Settle on one and stay with it. You will waste less in the long run.

Storing film. When fresh film arrives, mark each package with the date of receipt. It has a definite "shelf-life," and "oldest" film should be used first. You can extend the shelf-life of your film almost indefinitely by storing it in a refrigerator. (A second-hand refrigerator can be had for a few dollars.) This also stores it in a tightly sealed place, safe from ammonia fumes. If you cannot refrigerate, store film in as cool a spot as possible, in another room away from ammonia fumes. Remember that an open package of film is very sensitive to such fumes or prolonged exposure to any source of ultraviolet light.



Diazo equipment selection

A number of firms produce units which are suitable for school use. Select equipment that is primarily designed for diazo transparency production. Larger units are available for mass production of transparencies in a regional media center.

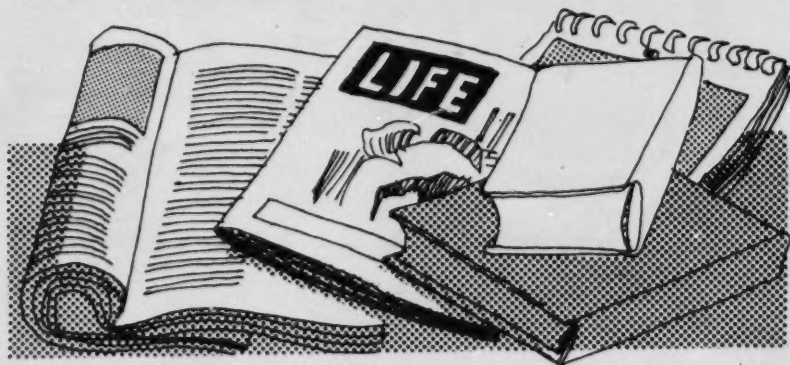


Though the diazo process in itself is more complex than the heat-transfer method, the diazo equipment is not. In those units having a manually operated exposure system (as opposed to an electric motor-operated roller feed) there is very little that can require maintenance. However, if possible, deal with a firm that can supply you with in-the-field orientation on the operation of their equipment.



photographic ("wet process") transparencies

In this process, also called the diffusion-transfer process, a matrix or negative paper is used to transfer the image to positive transparency film. Original material may come from books, magazines, newspapers, or multicolor printed matter. The exposed negative paper is placed against a sheet of positive film and run through a developing solution.

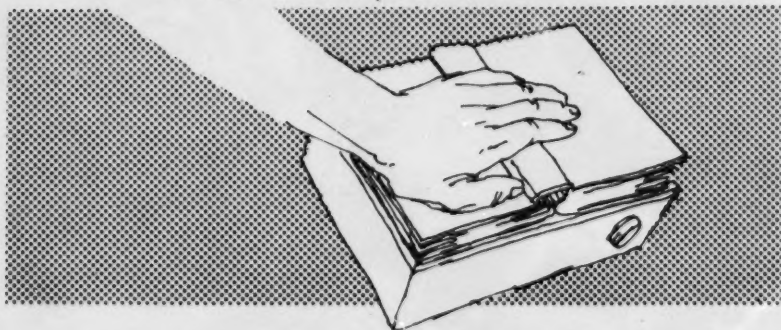


The advantages of such a system are several:

1. With some you can make a continuous tone transparency from a glossy photograph.



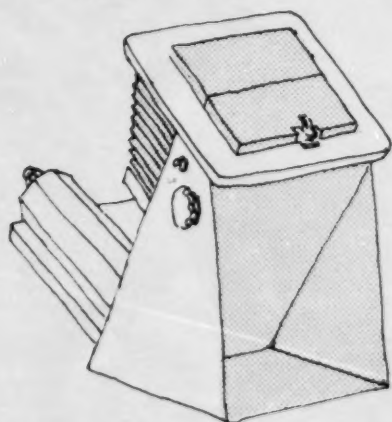
2. Most will make a black-line copy from all colors.
3. If you already have such equipment on hand for transcript or document copying, you probably need only the positive film to be able to produce transparencies.
4. A book copier attachment enables you to copy material from almost any book.



Not all such systems operate exactly alike, but some disadvantages are common to several:

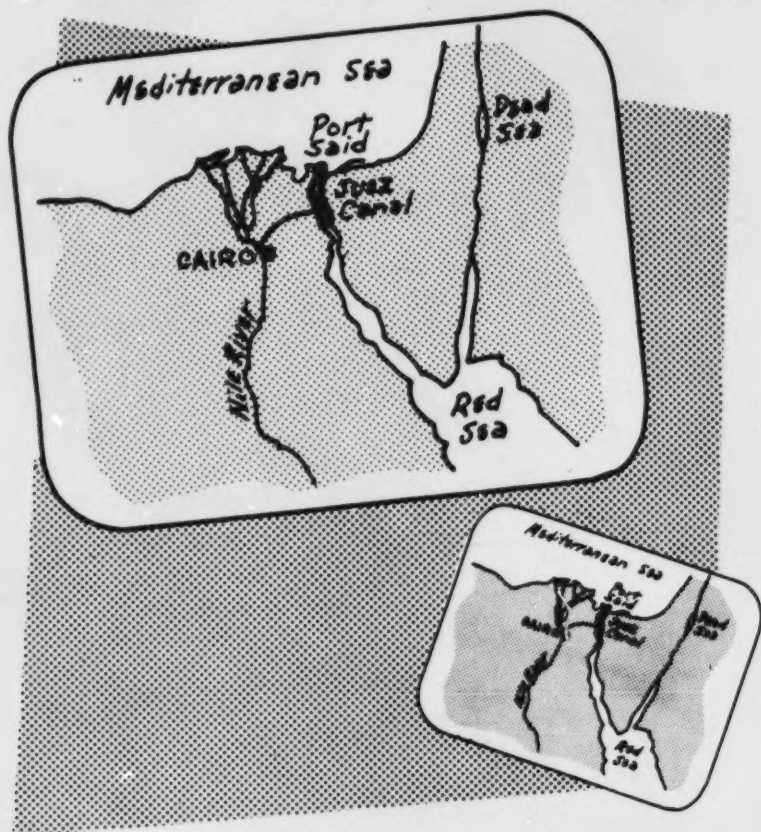
1. It is a wet process and requires fresh developer for good results. With some, the temperature of the developing solution has an effect on results. The transparency is wet and must be allowed to dry before use.
2. The process requires both a negative and a positive sheet in order to function.
3. The negative paper is usually extremely light-sensitive and must therefore be very carefully handled and stored.
4. With most systems, only black-line transparencies can be produced.

No attempt is made here to show "how to do it" because of the numerous different systems available. Each is equipped with adequate instructions for its operation.



Special equipment. An enlarging-reducing system which employs the diffusion-transfer process is of inestimable value in providing full support for overhead utilization. This equipment, available in different models and price ranges, is essentially a shutterless visualizer-camera which enables you to enlarge material to a size suitable for over-

head projection. Most typewriters do not produce a letter large enough for a transparency master. With this equipment you can easily enlarge standard-sized typing to a degree that is fully acceptable for projection. A paragraph or diagram from a book



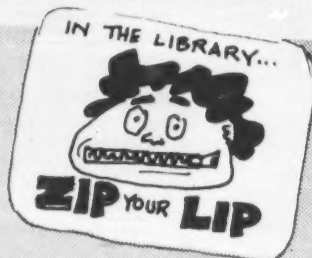
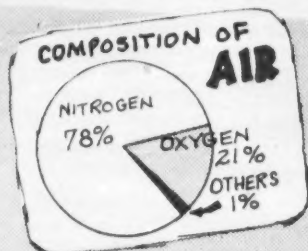
or a brochure can be enlarged in the same way. If color is needed, you simply make a master by the diffusion-transfer process and from it make your diazo transparency. Every complete Instructional Media Center should have this capability.

planning your visual

The overhead transparency is obviously only one of many instructional media. Thus we must ask ourselves, "Is this content appropriate for the overhead? Does it lend itself best to this medium?" Perhaps the visual needs to be seen for an extended period of time and should really be in chart or poster form. It is also possible to over-visualize. We should also ask ourselves, "Does this need visualization?"



Having determined that our content is appropriate for an overhead transparency, our first guiding theme should be simplicity. One main concept or idea should be the basis for our visual, not half a dozen. In addition to concepts, it is easy to overload a visual



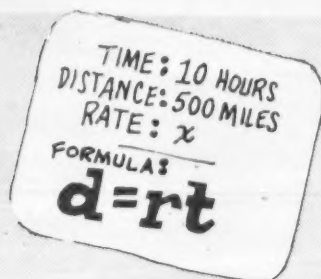
SIMPLICITY

with too many symbols, type faces, and just plain words. If your visual is made up of nothing but large amounts of verbal material, you are using the wrong medium. If you have something for them to read, it might just be better to duplicate it and provide each student with his own copy.

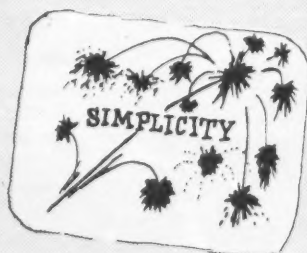
WHEN IN THE COURSE OF HUMAN EVENTS, IT BECOMES NECESSARY FOR ONE PEOPLE TO DISSOLVE THE POLITICAL BANDS WHICH HAVE CONNECTED THEM WITH ANOTHER, AND TO ASSUME AMONG THE POWERS OF THE EARTH, THE SEPARATE AND EQUAL STATION TO WHICH THE LAWS OF NATURE AND OF NATURE'S GOD ENTITLE THEM, A DECENT RESPECT TO THE OPINIONS OF MANKIND REQUIRES THAT THEY SHOULD DECLARE THE CAUSES WHICH IMPEL THEM TO THE SEPARATION. — WE HOLD THESE TRUTHS TO BE SELF-EVIDENT, THAT ALL MEN ARE CREATED EQUAL, THAT THEY ARE ENDOWED BY THEIR CREATOR WITH CERTAIN UNALIENABLE RIGHTS, THAT AMONG THESE ARE LIFE, LIBERTY, AND THE PURSUIT OF HAPPINESS. — THAT TO SECURE THESE RIGHTS, GOVERNMENTS ARE INSTITUTED AMONG MEN, DERIVING THEIR JUST POWERS FROM THE CONSENT OF THE GOVERNED, — THAT WHENEVER ETC.

Even diagrammatic visuals can become too complex. Analyze your content and determine if it can be broken down into two or three separate visuals. It is almost impossible to make it too simple. Multiple overlays that develop a concept may be your solution. (See page 51 ff.)

Use of color. One basic function of color is simply that it adds eye appeal; it makes your visual more alive and attractive. If this were not so, all your magazine ads would be in black and white. Color gets attention, helps focus on a word or a symbol. If that splash of color is the only one on the visual, it will get the most attention, and get it quickly.



Conversely, if you have too many such color focal points, they will compete for attention and possibly nullify the emphasis you planned for.



Color also helps achieve a change of pace in a series of transparencies. This is especially so if color tints are interspersed with color positives. In a color tint your entire background is one pastel tone, and your image is usually black. Handmade, heat-transfer, and diazo all offer color tint possibilities. It is also possible to use the tint in the same manner as color filters in a spotlight are employed. With this method you simply place the tinted sheet over your black-image transparency when you are ready to project.

A more specific function of color is to show differentiation, much as color is used on a map to distinguish between water and land or different regions of one country. (Always use blue for water.) Color can be used effectively with verbal material to differentiate between parts of a sentence or a paragraph.

EAST ASIAN LANDS
HAVE OFTEN BEEN
THE FOCUS OF
ATTENTION IN THE
COLD WAR.

ONLY BY UNDER-
STANDING THE
NEEDS OF THE
PEOPLE CAN WE
HELP THEM TO
RE-GAIN DIGNITY.

Just as you focus attention on one word by putting a block of color on it, you can do the reverse: put a color tint over the entire visual except for the word or symbol to be stressed.

EAST ASIA'S
PROBLEMS ARE
OF GREAT
INTEREST TO
WESTERN LANDS.

THEIR FATE IS
OF GREAT CON-
CERN TO ALL
FREEDOM-LOVING
PEOPLE.

An especially dramatic effect can be achieved by the use of an "explosive" or "jagged" outline. Your diazo master for this effect is simply a sheet of opaque paper with the jagged area cut out of the center.

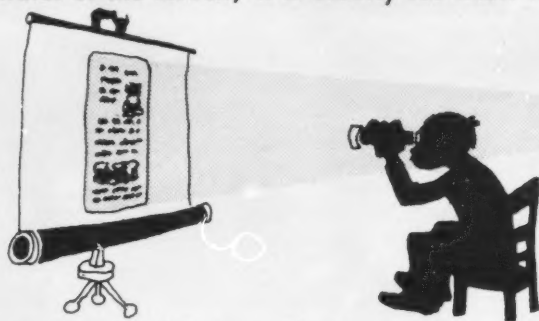


Diazo, though an excellent means, is not the only way you can employ color. It takes only a few seconds to add color to a black-image transparency with the right felt-tipped pens. Color can now be produced through a dry-copy process called "Dual Spectrum" which produces bright, diazo-like color. To utilize it you need dry-copy equipment and a special developer.

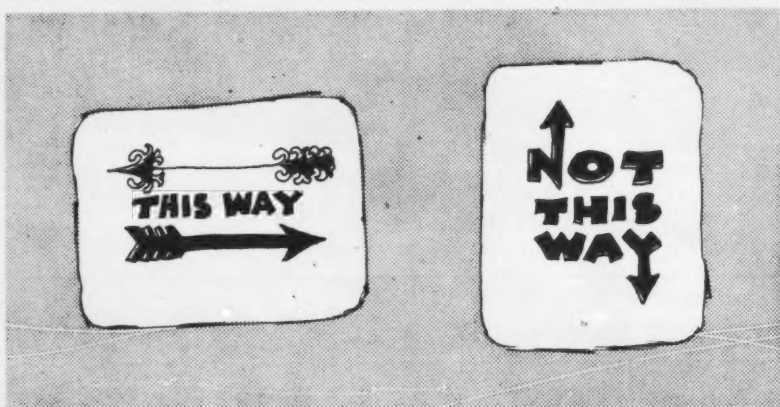
Indiscriminate use of color takes away its special value, so have a reason for using it. Each color overlay requires a separate master and this takes time. Obviously each color added also raises the cost of your transparency. Mounting a multiple overlay transparency is also more complex than a simple static. Wisely used, color will enhance your visual, but know what you want it to do.

General layout and format. Due to the vertical format of all the paper on which we write and type and the many periodicals we read, most of us are vertically oriented when it comes to planning a visual. Fight back. Don't do it. The overhead transparency should always be planned in the horizontal format. How many times have you watched a showing of 2 x 2 slides and noticed that when a vertical slide suddenly appeared it "spilled"

off the top and bottom of the screen? Why? Because most screens are either square or rectangular in shape and none has a vertical format. When you "shrink" the vertical visual to stay within the confines of the screen, it is usually too small to see.

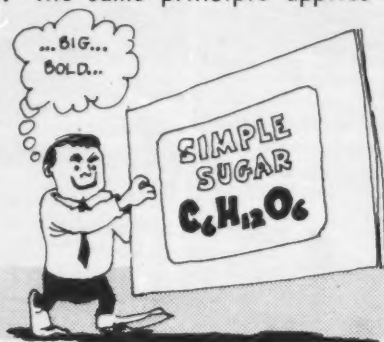


The eye is accustomed to horizontal format in almost all projected media: 35mm slides, filmstrips, 16mm, and movie theater wide-screen techniques. Except under ideal conditions, the viewer often fails to see the lowest part of a vertical visual. Keep it horizontal.

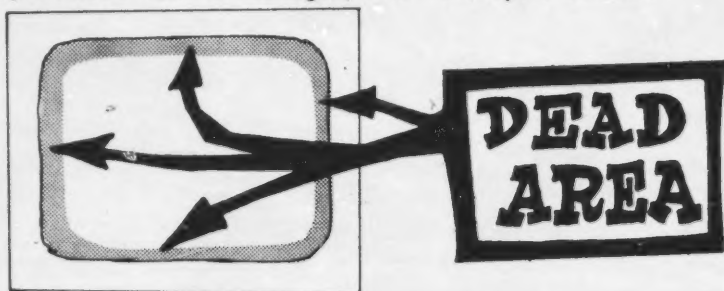


Think big! Think bold, when planning a visual. Use large letters, diagrams, and symbols. (See Chapter I, p. 17 on lettering.) This will also help insure that you keep it simple and avoid overloading. Remember that as the size of a letter in-

creases, the width of the line producing it should increase proportionately. The same principle applies to large symbols and diagrams.

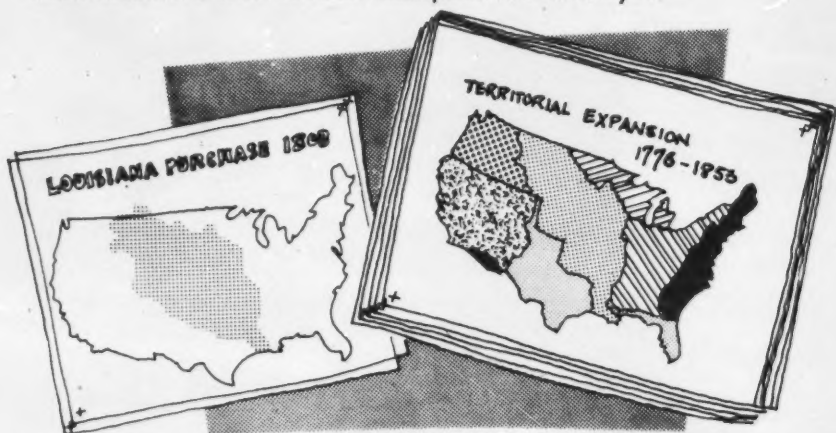


Take a lesson from the professionals who produce the magazine ads, and let space work for you. Keep your margins clear. Place a transparency mount over your master to see your work area. Leave the first 3/4 inch inside the frame edge free of material. It will enhance the visual's appearance. Then, too, some projectors simply don't focus sharply in that marginal area. Remember, we read from left to right, and from top to bottom.

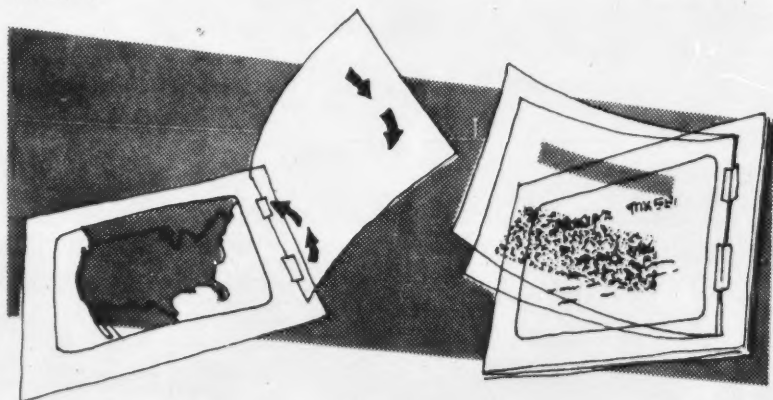


Planning overlays. When planning your visual, decide if and how you will employ overlays. The basic design of the transparency which is firmly fastened to the mount is called the "static." An overlay which is added to this and is equally non-manipulative is a "static overlay." A black-line U.S. map with a blue overlay showing large bodies of water might be an example

of this. A manipulative overlay might be added to this to show major ocean currents. A static might be the way to show the Louisiana Purchase. However, a visual which attempts to show the territorial acquisitions from 1776-1853 would probably be more effective with several manipulative overlays.



The static transparency is simpler to make, stores well, and is easier to use. The manipulative or "dynamic" transparency is more complicated in all these respects. Thus you need to be sure when planning your dynamic that the value obtained will justify its use.

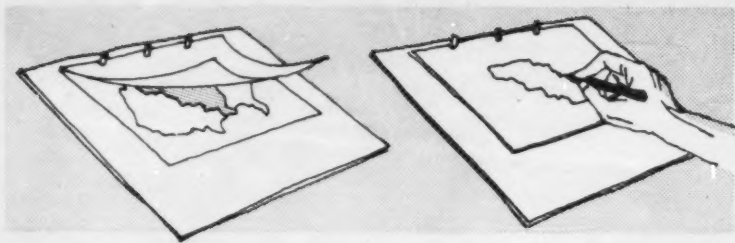


The dynamic overlay lends itself well to sequential content, such as westward expansion or a 3-step concept in algebra. It is also effective in showing contrasts. With a static outline of a line graph grid, different overlays could be used to contrast the development of the average annual wage, average income tax, and average indebtedness. Different methods for hinging overlays will be shown in Chapter VII. The dynamic overlay has a certain dramatic impact in that the overlay suddenly is superimposed on the static, seemingly appearing out of nowhere. Excessive use of this technique, as with any other, will blunt its effectiveness. Be selective in planning overlays.

Keeping masters in register. It will take at least two masters to produce the Louisiana Purchase visual. One will be the outline map of the U.S., which will probably be static. After completing the map, make cross-hair registration marks in opposite corners. When the ink on the finished master is thoroughly dry, simply pin or tape the second sheet of translucent paper squarely on top of it. Next, put cross hairs on the second sheet to match those beneath. On the second sheet draw the outline of the Louisiana Purchase. Fill in where you want color. (In the event that you trace both from another map, you need only ink in the tracing.) If the two masters match each other properly, the developed film can be easily matched as well by lining up the cross hairs.

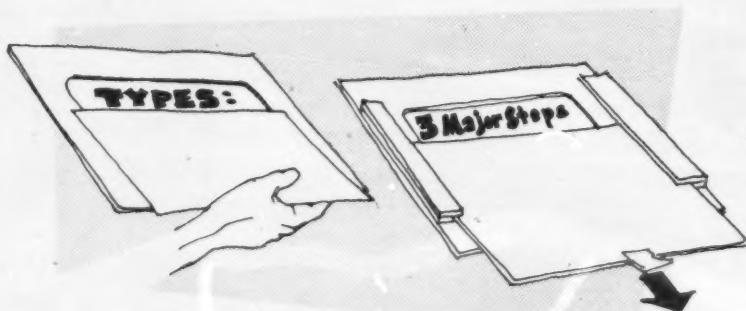
If you are going to be making a lot of overlays, it would be to your advantage to have a "pin registration" system. By this system your translucent paper and your film are prepared with a set of three punched holes along one edge. Your drawing board has three pins that match these holes.

When you expose the film, the master and film are kept in perfect registration by another set of pins. Then when you are ready to hinge your overlays to the transparency mount, the pins on the

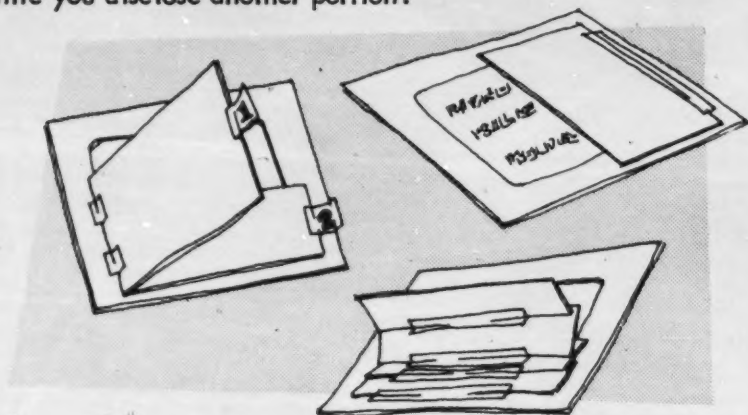


drawing board keep everything in registration while you fasten the hinges. Different techniques of hinging overlays are discussed in Chapter VI.

Sliding disclosure. It is possible to get a developmental effect with a static transparency by masking it and revealing only one part of the visual at a time. The simplest technique is to hold a sheet of paper or card over the transparency and pull it down as you wish to disclose a point. A better method is to mount the mask on the transparency in a set of tracks which enable you to make the disclosure more smoothly. You can make such tracks out of strips of cardboard or buy inexpensive plastic tracks. You can buy a special white plastic mask which is opaque to the viewer but transparent enough for the teacher to see through on the projection stage.



Hinged disclosure. The ways in which masks can be hinged are numberless. Several are illustrated here. With this approach, you can disclose a portion of the visual and then cover it again while you disclose another portion.

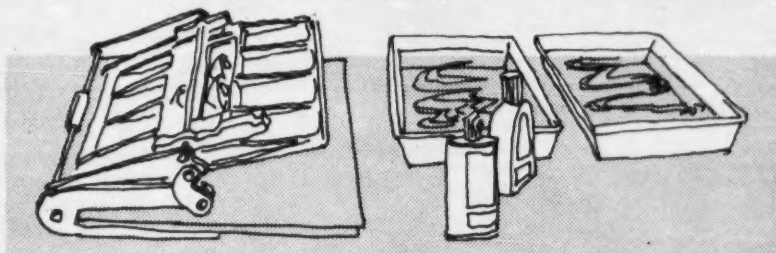


The big advantage in using the disclosure technique is that you keep attention focused where you want it, and your viewer is not distracted by other content on the visual.

vi.

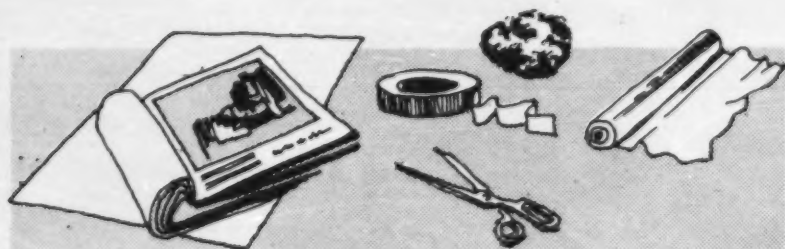
color-lift transparencies

Many magazines contain excellent multicolor pictures, maps, and illustrations that are suitable for classroom use. These can be dry mounted and displayed in the room. However, they are often too small for the entire class to view at the same time. In making a color-lift you simply transfer the ink from the magazine page to a sheet of transparent film which enables you to project the picture for all to see. This is accomplished by simply laminating the magazine page and then soaking the paper off the film. The ink alone adheres to the film, forming a near-perfect transparency.



To make a color-lift you will need:

1. Dry-mount press
2. Pressure board of 1/4 inch tempered masonite same size
3. Laminating film
4. Sponge
5. 2 flat pans of water
6. Liquid detergent
7. Clear plastic spray
8. Masking tape
9. Sheet of chipboard, posterboard scrap, or kraft paper
10. Magazine page to be lifted (color or black and white)



To determine if a page can be lifted:

1. Moisten a finger.



2. Lightly rub finger on margin of page.

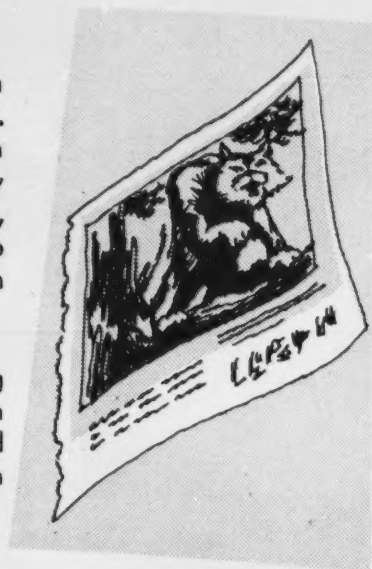


3. White residue will appear on finger if page will lift.

4. If no residue appears, THE PAGE WILL NOT LIFT.

How to make the lift

1. Place masonite pressure pad in press and preheat press to 270°.
2. Place magazine page in a cover sheet of folded kraft paper, place in press, and "precook" for 15-20 seconds.
3. Cut laminating film to fit magazine page. The cut sheet of film should be slightly smaller than the page, allowing the page to be 1/4 inch larger on all four sides.
4. With picture lying face up, place film on page to be lifted with dull side of film against picture.
5. Place picture and film between folds of cover sheet and place in press, picture still in face-up position.
6. Fully close press and "cook" for about two minutes. (Simply "cook" for another minute or so if picture is not fully laminated when you first remove it.)
7. Add about a tablespoon of detergent to one of your pans of water.



8. Remove laminated picture from press and place in pan of detergent water. Allow to soak for several minutes. (Strong detergent and lukewarm water will speed the process.)

9. Peel laminating film off magazine page. (If it does not peel easily, allow additional soaking time.)

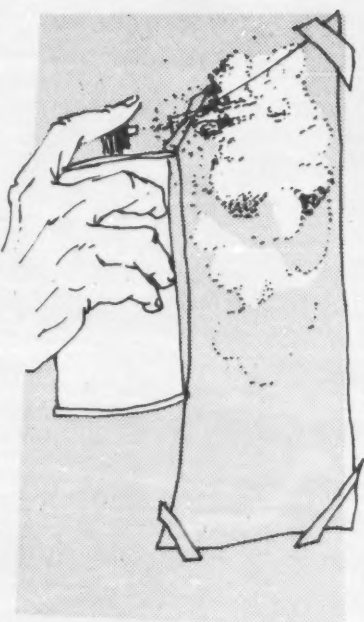
10. Place film on a smooth surface with dull side up. (Drainboard of a sink is ideal.) Wet sponge in detergent water and vigorously scrub residual clay off the film. Hold sponge so that fingernails do not scratch ink from film. Hold film up to light and examine for remaining patches of clay. Continue scrubbing until clay is completely removed.



11. Rinse the lift in clear water, blot dry with paper towels, and allow to air-dry. Another effective drying method is to hang the lift on a line with a clothespin.

12. When fully dry, tape lift down (by the corners) to kraft paper, or chipboard with the dull side up.

13. Holding spray about ten inches above the lift, apply one good coat. Do not apply additional coats as the quick-drying spray builds up on film and renders a darkened or pebbled effect on the projected transparency.



14. Allow lift to dry at least 15 minutes. Tape to transparency mount, and lift is ready to project. If it is to be used repeatedly, protect the ink side of the lift by permanently covering it with a sheet of clear acetate (or reprocessed X-ray) film.

General tips for better lifts. Select bright pictures with sharp contrasts. Avoid fuzzy, dull pictures. Keep the inked surface of the page to be lifted as clean as possible. Dust, oil, or lint will spoil a lift by preventing the ink from adhering to the film. Cute pictures are not always suitable as instructional media. Select those pictures that need to be enlarged and viewed by the entire class at one time. Collect pictures in a "Lift File" and do them in "batches." It is just about as easy to do six lifts as it is to do one.

vii.

mounting transparencies for projection

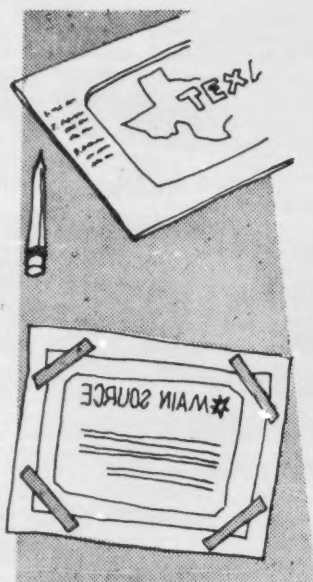
To mount or not to mount? A teacher in a typing class who makes a heat-transfer transparency of a student's work will probably put it on the projector immediately without mounting it. Immediacy is what gives it value in such a situation. However, a visual she has prepared before class will be mounted--fastened to a cardboard frame. Some of the advantages of mounting a transparency are:

1. It looks better and cuts out unnecessary glare from the area around the visual.
2. It gives the transparency rigidity, making it easier to use and file.



3. It helps keep the visual clean because you do not handle the film.
4. It provides writing space for labeling and notes.

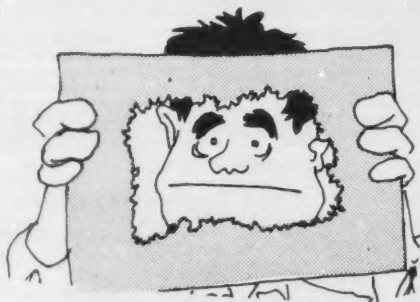
If a transparency is to be used just one time, it may be better to make a temporary mount. Simply fasten the four corners to the mount with masking tape which is easily removed. The mount can be used again after removing the transparency.



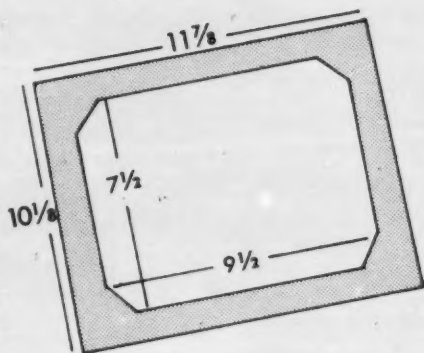
You could make a usable mount out of a manila folder simply by cutting out the necessary window. However, the results are neither speedy nor satisfying. Occasionally it may be necessary to use a handmade mount for a particular visual of unusual shape or size but it should be the exception and not the rule.

Well-made, die-cut, pressed board mounts are available commercially from various sources for as low as 28 cents each.

Several firms offer a sandwich type mount which is self-adhesive and holds the film between two frame halves. It is also possible to arrange with a local printing firm to stamp out mounts on a made-to-order basis if a large amount will be needed. In any



case, if you want to file transparencies in any standard file cabinet, the outside dimensions should not exceed $11\frac{7}{8}" \times 10\frac{1}{8}"$. (These will even fit older filing cabinets which are often surprisingly smaller.) The aperture or "cutout" of the mount is commercially available in various sizes. For general purposes an aperture of $7\frac{1}{2}" \times 9\frac{1}{2}"$ is acceptable. (This assumes that the equipment has a standard $10" \times 10"$ stage.)



Steps in mounting a static transparency

1. Work on a clean, bright surface. Dust and dirt can easily scratch and permanently damage the transparency film. A bright or light-colored surface will make the visual show up better and enable you to properly center the transparency on the frame.
2. Keep the baseline of the visual parallel to the edge of the mount. Tilted visuals look awkward when projected.
3. Tack the film to the mount at two film corners.
4. Check to see if it is properly centered. Unless it is a temporary transparency, tape down the film on all four sides, using a non-oozing tape that will resist drying out.

Mounting overlays. With static overlays it is usually adequate to tack down the basic and then fully tape down the overlay. It

is always wise to line up the crosshairs and "tack" down both, then check the registration before permanently taping the film to the mount.

Steps in mounting dynamic overlays

1. Place all overlays on the static and check registration. (If they have been exposed in a uniform manner, you can mount all overlays with the emulsion side down. They will lie better this way as the film curl will be uniform.)
2. Check for adequate marginal area on overlays for hinging. (You may need to move the static to accommodate the overlays.)
3. Mount static, taping all four sides.
4. Add overlays in same sequence in which they will be used, hinging each one carefully to keep it in register. Special adhesive hinges are sold for this purpose and are well worth having. If the overlay sequence is absolutely rigid, you can hinge all from the same side. If a flexible sequence is desired, hinge overlays from different sides of the mount.

You may want to add an overlay of clear X-ray film to some transparencies that are frequently used. Thus when you mark on the visual, or point out various items, the X-ray overlay takes all the abuse and protects the transparency. When it becomes scratched from much use, you simply replace it with a fresh sheet.

viii.

commercially produced overhead materials

Many firms now produce ready-made transparencies for overhead projection. Some publishers now provide transparency sets which are geared to specific textbooks. Many commercially produced transparencies are of excellent quality; many are not. Some high-quality transparencies are available on which the lettering is far too small. Many firms have jumped on the bandwagon to have a part of the transparency market. Don't assume that a big-name publisher will automatically have the finest transparencies. Never buy them sight unseen.

The advantages of using good commercially produced transparencies are many:

1. Time saving - it can take hours of work to produce certain visuals.
2. Professional results - highly skilled artists and tech-

nicians can turn out more attractive, more effective visuals than the amateur. This is especially true of some of the high-quality map transparencies on the market.

3. Sets and series are available.
4. Multicolor visuals on one static are produced.
5. Cost saving - Generally, they will be less expensive than original artwork. Good quality outline maps of all the states and dozens of countries can be had inexpensively. From the point of view of economy, good quality commercially produced map transparencies deserve serious consideration.

What are some drawbacks to using commercial transparencies?

1. Though usually adaptable, they may not all be geared to your curriculum.
2. You may have to purchase a set in order to obtain the few you really want.
3. Though this is becoming less and less a problem, the procurement cost may be an obstacle.
4. A final point to remember is that when you buy a finished transparency, you do not have a master. If the transparency becomes lost or damaged, it is gone. To replace a locally produced transparency you simply take the master out of the file and make a new one.

ix.

special uses and effects

Transparency production techniques discussed thus far will meet 95% of transparency requirements. However, for special presentations certain techniques are in order. The aim here will not be to give detailed how-to-do-it information but rather to call attention to several excellent possibilities which may be used to enhance instruction or an informational presentation.

Reversing film. One type of reversing film is exposed in the same manner as diazo. It is developed by immersing it in ordinary tap water. It then becomes the master for use with any kind of diazo film. Multicolor effects can be achieved by covering the lettering with transparent colored tapes, scraps of colored film or ink. Certain types of reversing film are processed in a heat-transfer machine. Unfortunately, some projectors employing the quartz-iodine lamp will produce a fuzzy "halo effect" with reversing film. This is not the case with all overhead projection systems.

Multicolor developers. You can produce various colors on one sheet of film without employing overlays with reversing film and multicolor kits. By swabbing or painting each line of text with a different solution bright colors are produced. Random swabbing with various colors will produce an unusual "marble" or "rainbow" effect. The multi-color film is exposed like diazo. The reversing film uses heat-transfer equipment.

Magic writing. Place a sheet of color negative film on the projector stage. At the appropriate moment write on the film with Xylene fluid. The writing immediately "appears" in a soft color tint on the dark background of the film.

Polarization effects. Though a somewhat more complex process to employ a few years ago, it is now a relatively simple matter to polarize transparencies. By this process you can produce simulated motion and flow-action on the overhead. One type now available makes it possible to have a caption or word "pulsate." It simply blacks out and reappears of its own accord. This effect is achieved by employing two polarized filters, one of which is built into the transparency. The other is rotated--either manually or automatically--in the light path. With this system you can show the pumping action of the heart, liquid flowing through a pipeline, and many other dramatic effects. Once you have the large filter, simple polarized visuals can be produced using ordinary cellophane. More sophisticated results can be obtained by employing specially produced polarized materials which are now available.

Projected scenery in stage productions. Pioneers in this area were the members of a theatrical group in the Holyoke, Massachusetts, High School. Sets are drawn on transparencies and projected on a series of large rear-projection screens. For scene changes one merely changes transparencies. "Sets" for several productions can be stored in a briefcase, thus eliminating storage problems. The show can be produced just about anywhere the rear screens can be set up.

Projection of solids. Any solid which is reasonably thin or flat will project a sharp silhouette. A paper clip, a key, or any similar object is easily identified. Precut letters can be manipulated on the stage and formed into a word as the viewers watch. Geometric shapes can be arranged to demonstrate balance and artistic arrangement.



Transparent solids, of course, lend themselves very nicely to overhead projection. A plastic ruler from the dime store can be projected while teaching measurement. Triangles, protractors, and even slide rules are now available which are designed for overhead projection. Certain petri dish solutions and demonstrations can be projected effectively. However, for test tube experiments a special overhead arrangement is available from several manufacturers which puts the stage in a vertical position and permits the test tube to remain upright.

implementation of the local overhead program

One of the prerequisites for an optimum program is to have a well-trained administrative leader at the local level. This individual should have received training from educators well versed in the technical aspects of a projected materials program; having administrative status in the local system, he should develop and supervise the implementation of the program.

With respect to in-service education requirements, the overhead system is not primarily equipment-oriented. In the case of 16mm film or 35mm filmstrips, where commercially prepared materials are used almost exclusively, the in-service emphasis has been on instructing teachers on how to thread the projector, etc. The overhead system presents a whole new concept. This system is materials-oriented. Consequently, the emphasis is placed upon the preparation and selection of the projected materials rather than upon the operation of the equipment, which is a relatively simple matter. The need here is not only for skills in preparing

materials, but an understanding of what is suitable for overhead projection.

Ideally, the teachers should first participate in an intensive in-service graphics program in the local production of nonprojected materials. In such a program they would learn (1) how to develop a tear-sheet file, (2) how to dry-mount and laminate these pictures, (3) how to do simple lettering, and (4) how to apply layout techniques. Most of the same basic principles in such a program apply equally well to the preparation, production, and utilization of overhead transparencies.

The first stage in implementing the overhead system is to provide adequate in-service education in the production of handmade transparencies, (i.e., the content of Chapter I). The capable instructor can provide this basic training in a few hours. The participants should have lab experiences in connection with this instruction, actually making some handmade transparencies. Though the school system may soon employ more sophisticated transparency production systems, these basic skills will not be lost. The teacher who knows how to make a handmade transparency will be better equipped to make and select masters for the other, more sophisticated processes. In addition to this, the need for handmade transparencies to fill certain gaps will always exist.

The teacher who completes the in-service training in the handmade process should be able to have her own projector as soon thereafter as she wants it. Not before. Nor should she begin by having to share it with another teacher. That makes about as much sense as sharing a chalkboard, an eraser, or a desk. This implies that if only a limited number of overhead projectors can be acquired to begin with, they should simply be assigned to a limited number of teachers and not placed in a pool.

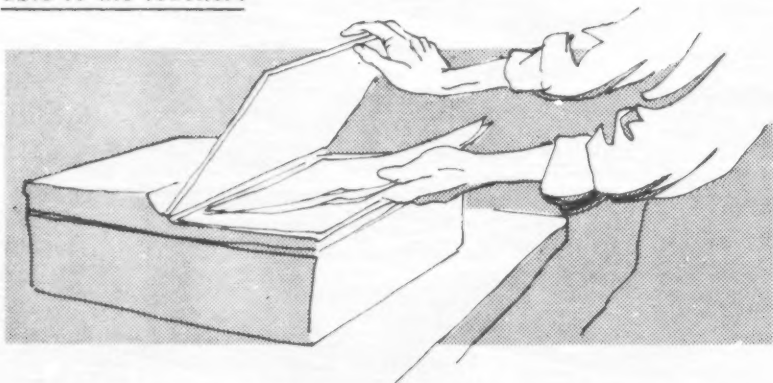
The second stage would consist of instruction in the production



of transparencies by the heat-transfer process. Teachers who have learned the handmade process will be better equipped to select and arrange materials for heat-transfer masters. They will have learned about the importance of simplicity, adequate lettering size, and proper format. It is a mistake to begin with the heat-transfer process. Too many basic understandings will never be acquired in such an approach. Lab experience should immediately follow the demonstration of basic techniques. When teachers have seen a "flimsy" transparency made with the polyester film in the silk-screen carrier, they should make one immediately themselves.



Having taught these two stages, we have the basis for a modicum program in overhead utilization. The teachers will be equipped to make their own transparencies and can utilize any transparency masters on the market. Yet no operation of complicated machines need be learned, and no complex processes mastered. Heat-transfer units should be distributed so as to be easily accessible to every trained teacher. Local finances will determine whether this initial distribution is one per building, one per wing, one per department, or the ideal of one per teacher. Do not start a heat-transfer program if the equipment is not going to be readily available to the teacher.



The third stage should be the in-service program in using the diazo process to produce transparencies. This should not be introduced until stages one and two are completed and in operation. (It is inadvisable to try to teach all three stages in too short a span of time.)

This is the more sophisticated step in transparency production and should be handled as such. Light-sensitive materials that require ammonia fumes for development are less simple to manipulate than the two former types. Film should be stored under refrigeration. Proper exposure time and ammonia condition are both important to satisfactory results. In view of this, it is best to consider the final step of diazo production as a central media support function.

Teachers should be trained, in a lab situation, to make diazo transparencies with heavy emphasis on the preparation of the master. They should be taught all the steps. They should make several themselves. However, it is too much to expect every teacher to become a diazo technician. One person should be trained to handle exposure and development at the building level. Advantages in this are several: (1) less waste from improper exposure times; (2) better quality control of materials with one person responsible; (3) happier teachers because they will be receiving a service and getting good diazo transparencies every time. A few will prefer to do their own and should be permitted to do so.

The next logical step in such a program would be to provide administrative and teaching staff with the services of a part- or full-time artist. The superintendent who is able to use tailor-made visuals to present his story to the community, is also one who will be more inclined to give strong support to the instructional media program in his school system.



A second basic aspect of implementation is that of equipment acquisition and distribution. How much equipment should be procured? Where should it be located? How should it be arranged? Obviously, to answer these questions in great detail would involve a thorough treatise on Instructional Materials Centers, their establishment, operation, and administration. Such is beyond the scope of this publication. However, the administrator who desires to develop and maintain an effectual media program will seek out consultative services and will ex-

amine the available literature to become knowledgeable in this area. With reference to the mechanical aspects of implementing the overhead system, we will limit our remarks to some basic principles and general guidelines.

Selecting your overhead projectors

Take note that the word "projectors" is used. One model will not necessarily fit all situations. Various factors must be taken into consideration in order to make wise selections.

Location. Where will the projector be used? In one classroom only? In an auditorium with large groups of students? Determine the light-control situation where the projector will be used. The average-size classroom, having few windows or none at all, presents no problem to the lightweight projector with the quartz-iodine lamp; however, a room with many windows, no light control, and bright sunlight, will probably require a projector with a rated 1000-watt lamp. The overhead projector can be used in a lighted room, but if direct or brightly reflected sunlight falls on the screen, the image will be greatly "washed-out."

Portability. Will it be necessary to carry this projector anywhere? If so, the weight factor may be important. If the projector is to be carried to different parts of the city or out of town for special presentations, it may be more convenient to have one of the lightweight projectors that fold into a compact carrying case.

Service. What kind of service is available if the projector becomes damaged? Will you have to ship it to the factory?

Performance. What kind of image does the projector put on the screen? Is the light distributed equally? How much of the visual

remains in focus? The ideal way to compare projectors is to set them up side by side and compare the brightness and clarity of the image on the screen. This is usually the acid test.

The important thing to remember is that one overhead model won't meet all your projection needs any more than one truck can be used for all trucking needs. Under reasonable conditions the lightweight, less expensive projector serves the average classroom quite well. For large group instruction or auditorium presentations, don't expect the pickup truck to do the job of a moving van.

As indicated earlier, the classroom overhead projector should not be regarded as a portable piece of equipment to be checked out of a general pool. It may be light enough to carry, but that fact is irrelevant to this discussion. More than any other type of projector, the overhead tends to change a teacher's approach to instruction. As she learns to visualize more concepts and ideas, she will begin to reach for the overhead on the spur of the moment. To compel her to continually book the projector in advance, carry it in, and set it up in her room, is to stifle spontaneity and freshness in instruction. The good teacher will not always be able to indicate in her lesson plans that she will need an overhead at 10:20 on Wednesday. The instructional situation requiring it may not develop until 10:15. To be properly integrated with other instructional materials, the overhead should be as accessible as a piece of chalk. In many school systems today it has become an accepted practice to place an overhead projector permanently in every classroom. This is the only sensible route to follow. Though it may not initially be feasible to procure this number of projectors at one time, it should certainly be a definite and well-established goal.

It logically follows that where a projector is located permanently there must be a screen as well. This screen should be attached to the wall of the room and be mounted high enough to permit

the lowest part of a projectual to be seen easily. Some schools have made their own screens out of a lightweight building material. If this is done, they should be mounted in such a way as to eliminate the distortion of the projected image called "key-stoning." Tripod screens are simply not satisfactory for use with the overhead. Lightweight screens are now produced which are relatively inexpensive and can be easily adjusted for the proper "tilt." This added capability makes it possible for the same screen to be used for other projected media as well. Be sure to provide larger rooms with proportionately larger screens. There should be a wall-mounted screen and a projector in every classroom.



There are tangible fringe benefits to this philosophy. It is generally known that high-intensity projection lamps are relatively delicate and fragile. Constant movement of projectors around the building or campus will surely increase the replacement factor. The statistical probability of projector damage rises steeply when such equipment is constantly moved about. Thus you keep lamp

replacement and maintenance at an absolute minimum when you permanently station a projector in one classroom. Projectors thus positioned do not require a wheeled projection cart, an item costing half as much as the projector itself. For every two carts thus eliminated you can buy another projector. Permanently mounted overhead screens last almost indefinitely. Thus, from a long-range point of view, there are also certain non-instructional advantages in this approach. Less tangible, and more important, is the fact that you release the teacher from cumbersome, time-consuming manipulation of equipment and allow her to concentrate on instruction.

As indicated in Chapter II, the heat-transfer unit would ideally be located in the classroom. This is especially true where there would be frequent need for projecting student work, as in a short-hand or typing class, to point out errors and display samples of work well done. The next-best thing is to have the unit as near as possible to the teacher. A good starting point might be one per building in a small school and one per department in a large school. As utilization increases and as funds permit, additional units should be added to bring the service ever closer to the point where the instruction takes place.

The diazo equipment is of a different nature. Powerful ammonia fumes and sensitive film dictate other arrangements. Ideally speaking, diazo processing should be a service function. A teacher should be able to hand in a master (or a set of masters) indicating what colors are desired and the method of mounting if overlays are required. (In a sophisticated program she will hand in the idea, and a graphics technician will develop and produce the desired transparency.) Provided that film storage requirements are met and some ventilation of fumes is possible (i.e., an open window or circulated air) one diazo unit per building should be provided.

A large school system with a Media Center or Instructional Materials Center will need at least one diazo whiteprinter, a machine which will make diazo transparencies at a comparatively high rate of speed. Such a machine is an absolute must when you need to make multiple copies of a set of diazo masters. In such a production situation pin-registration equipment should also be given careful consideration as a means of achieving accuracy and time savings. The initial cost may be ten times that of the small building-level unit, but it doesn't take long to retrieve this in man-hours saved when you are producing ten to twenty copies of a given set of diazo masters.

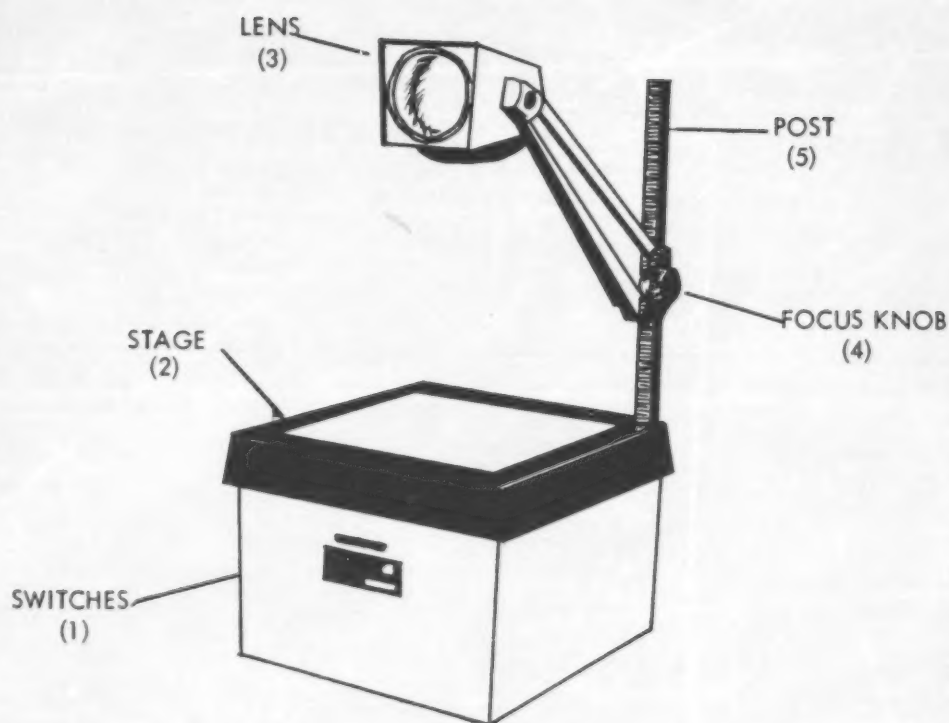
XI.

the projector

This chapter is included for the benefit of those who, for different reasons, find the overhead somewhat difficult or awkward to use.

There are some basic rules to observe:

1. Become familiar with the machine you have selected for use. Begin by reading the operator's manual or have someone familiar with the machine help you with its basic operation.
2. Practice using the machine until you are familiar with its operation and can use it with confidence in the classroom.
3. Plan your use of the complete system with care. Coordinate your visuals, movements, and lesson plan so they flow smoothly.



The overhead projector is a very versatile machine. At the same time it is probably the most simple visual aid other than the chalk board. While this is true, there are some instructors who have trouble with the overhead.

A brief look at the working parts of the overhead projector and their functions will help in avoiding some of the frustrations.

1. Switches - This is usually simply an "on-off" switch. Some projectors will have a "fan" switch also. The instructor may hear a fan motor running after the projector is turned off. This is usual because the fan will continue to cool the lamp for a short time and then turn off automatically.
2. Stage - This is made up of a fresnel lens underneath and a plate glass top. Some projectors are equipped with continuous roll attachments. You will need to practice using this attachment in order to prevent some basic mistakes.
3. Lens - The lens or head is found at the top of the post. On most projectors the lens will tilt. This feature allows quick adjustment to the screen without adjusting the whole projector. Some models feature a regular and wide angle lens.

Most of the time the projected image will be larger at the top than at the bottom. Do not be alarmed. This is normal.

4. Focus Knob - This may be found either on the post or where the post goes into the projector. Some machines will have an electrical focus. Regardless of the positioning or whether it is manual or electrical, the function is the same, to raise or lower the lens. This brings the image into focus.

As stated in Chapter X, survey your needs before purchasing your next overhead projector. There are many brands, sizes, and prices where the "living chalkboard" is concerned. You can even buy the highly portable attache case model.

Regardless of the size or price, the attachment that is most important in the projector's operation is the owner's manual. Read it carefully and use it often.

appendix

This list of firms and their products is only a representative list of suppliers. These firms have supplied us with their current addresses, information about their products and ways to get the best results from efficient use of these goods. By contacting these companies and others, you can build an excellent resource catalog. The best thing is the price--usually the brochures are free.

Arkwright, Inc.

Fiskeville, Rhode Island 02823

Manufacturers of overhead projectors, geographic diazo color and thermal transparency film.

Artograph, Inc.

529 South Seventh St.

Minneapolis, Minn. 55415

Large projectors and graphic arts, exposure units and accessories.

Bell and Howell

7100 McCormick Road

Chicago, Illinois 60645

A large line of overhead projectors and audio-visual equipment.

Blu-Ray, Incorporated

Essex, Conn. 06426

Manufacturers of a full line of white-printers that can be used for making diazo transparencies.

Buhl
5 Paul Kohner Place
Elmwood, N. J. 07407
Overhead and special audio-visual projectors and systems.

The George F. Cram Co., Inc.
301 South La Salle St.
P. O. Box 426
Indianapolis, Ind. 46206
Makers of screens.

Da-Lite Screen Co., Inc.
3100 State Road 15 North
Box 629
Warsaw, Ind. 46580
Makers of slide and movie screens for all audio-visual needs.

Eastman Kodak
Rochester, N. Y. 14650
In addition to cameras, film and a wide variety of audio-visual equipment, they also have a wide range of publications.

Ed-Tech Service Company

Box 407

295 Main Street

Chatham, N. J. 07928

Supplier of a wide range of audio-visual equipment.

Elmo Manufacturing Co.

70 New Hyde Park Rd.

New Hyde Park, N. Y. 11040

A wide variety of overhead projectors and other projectors.

M. P. Goodkin Co.

140-146 Coit Street

Irvington, N. J. 07111

Manufacturers of cameras for large scale copy work and diffusion transfer copiers for transparencies.

Hoppman Corporation

5410 Port Royal Road

P. O. Box 1463

Springfield, Va. 22151

Makers of a full line of audio-visual equipment and accessories.

Kalart Victor Corporation

Plainville, Conn. 06062

Makers of audio-visual and educational television products and film editing equipment.

(Kalart-Victor Corporation purchased the American-Optical projection lens.)

Labelon Corporation

10 Chapin Street

Canandaqua, N. Y. 14424

Makers and suppliers of a wide range of transparency film.

Letraset U. S. A., Inc.

40 Eisenhower Drive

Paramus, N. J. 07652

Instant letters, pens, chart making aids, color markers and color guides.

Marsh Stencil Machine Co.

P. O. Box 388

Belleville, Ill. 62222

Manufacturers of marking pens and marking devices.

Charles Mayer Studios, Inc.

168 E. Market St.

Akron, Ohio 44308

Producers of display, training, and visual communications equipment.

Mitchell Art Productions

4435 West 58th Place

Los Angeles, Calif. 90043

A supplier of the "briefcase" overhead projector.

Plastic Suppliers

A Division of Plasticorp

815 Mercury Street

Duncanville, TX 75137

Transparency material in rolls and sheets including Zerographic transparency material.

Richard Manufacturing Company

A Division of M. Brunson Motley, Inc.

5914 Noble Avenue

P. O. Box 2910

Van Nuys, Calif. 91404

Transparency illuminators, filmstrip containers, and album pages.

J. S. Staedtler, Inc.

P. O. Box 68

Montville, N. J. 07045

Manufacturers of a large line of marking and lettering pens.

T. M. Visual Industries, Inc.

25 West 45th Street

New York, N. Y. 10036

Makers of several kinds of A-V equipment and systems, including overhead projectors.

Valiant I. M. C.

195 Bonhomme St.

Hackensack, N. J. 07602

Supplier of a wide range of audio-visual needs.

Visual Materials, Inc.

167 Constitution Drive

Menlo Park, Calif. 94025

Suppliers of instructional materials and supplies.

Wilcox-Lange, Inc.

3925 N. Pulaski Road

Chicago, Illinois 60641

Folding projection screens.

OTHER PUBLICATIONS OF THE FILM LIBRARY

Basic Design and Utilization of Instructional Television
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Instructional Display Boards

Publications are available for \$2.50 each plus \$1.00 handling. The entire set of twelve is available at the discounted price of \$24.95. Texas residents add 5% sales tax. Your institutional purchase order or prepayment must accompany your request. Orders under \$10.00 must be prepaid. Sorry, no returns or complimentary copies available. Foreign customers must include payment for postage. All foreign orders must be prepaid in U. S. currency. Free descriptive brochure available upon request.

The Film Library also has available for rental 16mm educational films. These films are distributed throughout the U. S. For a catalog of films available, send your remittance of \$2.50 for each copy desired. Write:

The University of Texas at Austin
General Libraries/Film Library
Box W
Austin, Texas 78712